

Notice of Allowability

Application No.

09/363,578

Examiner

Mark Ruthkosky

Applicant(s)

RYU ET AL.

Art Unit

1745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 12/8/2004.
2. ☒ The allowed claim(s) is/are 1-5.
3. ☒ The drawings filed on 29 July 1999 are accepted by the Examiner.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☒ All b) ☐ Some* c) ☐ None of the:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____

Mark Ruthkosky
12/15/04

DETAILED ACTION

Response to Amendment

The amendment filed 12/8/2004 has been considered. Claim 8 has been canceled by the amendment. Claims 1-5 are pending in the application and have been indicated as allowable.

Allowable Subject Matter

Claims 1-5 are allowed.

The following is an examiner's statement of reasons for allowance:

The instant claims are to a carbonaceous active material comprising at least one crystalline, graphite core, and an amorphous, graphitizable, carbon shell coating the outside of the crystalline graphite core. Differential thermal analysis conducted on the carbonaceous active material in 10°C increments per minute starting from room temperature and proceeding to 1000°C at atmospheric pressure results in the displaying of at least two exothermic peaks overlapping to form shoulders. The amorphous, graphitizable, carbon shell coating is derived from an amorphous carbon precursor selected from the group consisting of pitch, coal based oil and heavy oil. Further, the active material of at least one crystalline graphite primary particle coated with amorphous carbon is agglomerated and made into a spherical shape to produce secondary, agglomerated particles.

The prior art does not teach carbonaceous active material comprising a crystalline, graphite core with an amorphous, graphitizable carbon shell coating the outside of the crystalline graphite core, wherein the amorphous, graphitizable carbon shell coating is derived from an

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amorphous carbon precursor selected from the group consisting of pitch, coal based oil and heavy oil; wherein the amorphous carbon coated active material is agglomerated into a spherical shaped, secondary, agglomerated particles.

The most pertinent prior art has been presented.

For example, Kuribayashi et al. teaches a lithium secondary battery, which comprises particles with a graphite core, surrounded by an amorphous carbon shell. The particles have a graphite structural part and an amorphous type part (see page 1, lines 10-end). The shell is comprised of a coke-like carbon (page 1, col. 2, lines 10-15.) Example 1 and paragraph 1 on page 5 teaches the shell to be pitch-blended phenol resins. Coke is formed from a pitch precursor. The mixture is also a solid solution. Differential thermal analysis is a means for analyzing the carbon materials. Differential thermal analysis is not taught in the Kuribayashi et al. reference; however, the properties indicated by differential thermal analysis would be inherent. The carbonaceous material would have two, separate, inherent, exothermic peak values based on the graphite material and the non-graphite material. Kuribayashi does not teach the active material of at least one crystalline graphite primary particle coated with amorphous carbon to be agglomerated into spherical shaped secondary, agglomerated particles.

Ueda et al. (US 6,027,833) teaches a lithium secondary battery, which comprises particles with a graphite core, surrounded by an amorphous carbon shell. The particles have a graphite structural part and an amorphous type part (claim 1, col. 4, lines 15-35; line 64-col. 5, line 10; and col. 8, lines 5-58.) The shell is comprised of a coke-like carbon (page 1, col. 2, lines 10-15.) The shell is formed from hydrocarbons, pitch, tar, or phenol resins. The particles are added to a solution of an amorphous, graphitizable, carbon shell coating precursor and the material is

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carbonized at a temperature equivalent to that of the instant specification. Differential thermal analysis is a means for analyzing the carbon materials. Differential thermal analysis is not taught in the reference; however, the properties indicated by differential thermal analysis would be inherent. The carbonaceous material would have two, separate, inherent, exothermic peak values based on the graphite material and the non-graphite material. The Ueda reference, however, does not teach the active material of at least one crystalline graphite primary particle coated with amorphous carbon to be agglomerated into spherical shaped secondary, agglomerated particles.

Further, Itoh et al. (6,103,423) teaches a lithium secondary battery, which comprises particles with a graphite core, surrounded by an amorphous carbon shell. The particles have a graphite structural part and an amorphous part (see col. 2, line 35 to col. 3, line 35; col. 4, line 25-end; col. 6, lines 20-30 and claims 1-18.) The shell is comprised of hydrocarbon, phenol carbon resins, furan resins and polyamide resins. These materials are functional equivalents used to form the amorphous layer of the instant invention, as shown on page 5 of the instant specification. The particles are added to a solution of an amorphous, graphitizable, carbon shell coating precursor and the material is carbonized at a temperature equivalent to that of the instant specification. The reference does not teach the amorphous carbon precursor is selected from the group consisting of pitch, coal based oil or heavy oil, and in addition, it does not teach the active material of at least one crystalline graphite primary particle coated with amorphous carbon to be agglomerated into spherical shaped secondary, agglomerated particles.

For these reasons, claims 1-5 are allowed over the prior art. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid

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processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Examiner Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark Ruthkosky whose telephone number is 571-272-1291. The examiner can normally be reached on FLEX schedule (generally, Monday-Thursday from 9:00-6:30.) If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached at 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Mark Ruthkosky
Primary Patent Examiner
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12/15/2004